# DWR Biodiversity WS Project

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The Utah Division of Wildlife Resources (UDWR) is the state's primary agency for collecting, maintaining, and evaluating sensitive species occurrences, regulatory compliance, and natural resources information. UDWR proposes to utilize the existing node infrastructure at the Utah Department of Environmental Quality (completed under a previous Exchange Network Grant) to implement a data flow for biodiversity data maintained by the Utah Natural Heritage Program within UDWR. The proposed project will integrate geospatial data with sensitive species and habitat information into a geospatial database to be shared through the EPA Exchange network. The second phase of the project will design and implement the database into a GIS-based web service for application requests concerning the location of animal and plant species for making environmental regulatory decisions.Project Contacts:

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Documents, General

Geodatabase and Data Modeling Documents

Project Goals:

Goal 1. Design and Implement Utah Biodiversity Geospatial Database (UBGD)

The first goal of the project is to design and implement a geodatabase, within the ESRI Spatial Database Engine (ArcSDE) enterprise environment that will hold a derived copy of existing Utah Natural Heritage Program geospatial data in a GIS accessible format. The Biotics is a database management system currently used by NatureServe and their partners to manage biodiversity data. Biotics is used to manage and analyze local and range-wide biodiversity information on species and ecosystems.

A strategic subset of the Utah Natural Heritage Program’s (UNHP) existing tabular data structure housed in an Oracle database, will be selected for inclusion in the new UBGD. As the existing oracle database houses over 500 relation tables, the goal will be to replicate a smaller, integral set information pertaining to geospatial and other commonly used.data elements into the UBGD. The geodatabase structure will be based on the relational database schema currently used by Biotics and will greatly improve the data viewing and submission possibilities, ease of use, and quality and quantity of Biotics data collected by UDWR biologists, both at the central and field offices.

though web services and interactive map applications. Domain restrictions used by Biotics will be included within the geodatabase in order to ensure standardization of data quality and control. The UBGD will be created within Utah’s State Geographic Information Database (SGID) and will include both public layers available to the Utah GIS community at large and restricted data available to the UDWR and trusted partners. Table 1. Project goals, tasks, target dates, outputs and outcomes.GOALTASKTARGETDATEOUTPUT/OUTCOME1. Design and Implement Utah Biodiversity Geospatial DatabaseDevelop database schema; design and implement Heritage GeodatabaseQTR 1/2Enhance utility of Heritage database by creating a GIS environment to better collect spatial data elements and to allow richer spatially related descriptive information (ownership, jurisdiction, etc) to be derived from spatial overlays; 2.

Periodic Update of UGDB from Utah Biotics Database.Program automated updates of GIS-based datasets representing a strategic subset of geospatial biotics database elements. Will be done with a schedule task utilizing arcobjects QTR 3/4Efficient transfer of existing Utah Natural Heritage Program Biotics data into a GIS context (SDE enterprise geodatabase) to allow more robust, accessible visualization, query, and editing of spatial data. Data, where appropriate will be available to Utah GIS community through inclusion in the State Geographic Information Database.3. Develop User-Access Interface for UDWR BiologistsDevelop detailed inventory information form with GIS point and polygon editing capability,data validation, pick lists, required fields, etc.; Develop web-based upload capability for MS Excel and Shapefile data formats; Develop server side application for receiving submissions and staging for approval/qc editing.QTR 4/5Paperless transfer of biodiversity data, improving data accuracy, completeness, usability, and increased efficiency4. Develop staging and submission process for geospatial additions and modifications to Biotics database contentEstablish process for acceptance and quality control editing of incoming data from web applications (from 4, above). Process will include protocols for review, edit, acceptance within ArcGIS ArcMap and functionality to transfer accepted updates to the Utah Biotics Oracle database.QTR 6Paperless transfer of biodiversity data, improving data accuracy, completeness, usability, and increased efficiency. DNR database administrators will be able to leverage efforts at field offices into increased and improved data in the biotics databaseLive5. Connect Utah Biotics Oracle database to DEQ Exchange Network NodeEstablish, test and maintain connection at DEQ node, develop trading partner agreement with NatureServe for upload of Utah Biotics data.QTR 6/7Utah Biodiversity program data available in response to National Exchange Network partner requests via DEQ node data. Demonstrate ability of geospatial database to integrate into the Exchange Network. Utilize existing standards for storage and transfer of Biotics related data6. Web-based ApplicationDevelop web-based interactive map for development site suitability analysis; integrating with Utah Biodiversity Geodatabase; develop layered security accessQTR 8Assist regulatory community by providing GIS-based web application to determine possible impacts to sensitive species. Assist local educators and researcher access to limited data on wildlife in Utah. Goal 2. Periodic Update of UGDB from Utah Biotics Database

Once the UBGD structure is finalized, AGRC programmers will work with UDWR staff to design and implement the automated upload process, schedule, and formalize the process with. The update process will utilize an ODBC connection to the Biotics Oracle Database and ArcObjects Visual Basic scripts to repopulate the UBGD with the most current Biotics data.

Goal 3. Develop User-Access Interface for UDWR Biologists

Several internet-based applications will be developed for biologists to enter their data directly into the Heritage Geospatial Database. The first will be a detailed data entry form with map editing capability, utilizing the same attributes fields as NatureServe’s Biotics database for UDWR biologist to enter species information from any computer with an internet connection in the state of Utah. When completed, an authorized user will be able to add, preview, and edit new information and then submit the data to a staging area in the UBGD for acceptance by the UDWR Heritage database administrator. This goal will be met utilizing AGRC’s ArcGIS Server software and architecture together with .NET programming environment. AGRC is currently developing and hosting similar distributed viewing and editing functionality for the Utah Division of State History’s archaeology database, the Utah Underground Injection Control Program (under an 2005 EIEN grant), and the Utah Department of Transportation. A second and third related web-based application will enable users to upload data in a standardized MS Excel spreadsheet format or ESRI Shapefile format and have an ArcServer application convert and store the data in these formats into the UGDB data model. This application will allow for bulk submissions by those natural resource agencies with large quantities of data, particularly UWDR field offices. In all of these web-based applications, access to the submission functionality will be granted to authorized.

Goal 4. Develop staging & submission process for geospatial additions & modifications to Biotics database

To date, edits to the Utah Biotics Database have been conducted only by UWDR database administrators in the central office. Many barriers exist for getting all of the data that is being collected statewide into the Biotics database. There is no standard or agreed upon mechanism for UDWR biologists, especially those in regional and field offices, to get their observed data entered into the Biotics database. Goal 3 will establish standards and several web service applications to facilitate the submission of a much greater volume of data. Still it is paramount that the field data submissions must be reviewed, quality controlled, marked for acceptance before inclusion into the Biotics database. This goal will formalize and implement business processes for the submission and acceptance of data (including validation rules, tracking of submissions and status, and notification protocols). In addition, this goal will require the creating of a ArcObjects script to prepare accepted data submission in the UBDG for insertion or updates to the Biotics Oracle Database.

Goal 5. Connect Utah Biotics Database to DEQ Exchange Network Node

This project will demonstrate the capability of enterprise geospatial database technology and its ability to exchange GIS information with the National Environmental Information Exchange Network via the Utah DEQ Exchange Network Node. An attribute mapping will be developed between the Utah Biotics Database schema and the national XML standards under development by the biodiversity data exchange currently in development at the Environmental Information Exchange Network and NatureServe. Subsequently, the Utah Biotics Database will be connected to the DEQ node and

NatureServe, who has an Exchange Network Node, will be able to receive biodiversity data flow.

Goal 6. Web-based Application

An ArcIMS-based, internet mapping service application will be developed to provide developers, planners, builders, educators, researchers and other interested parties access to the Heritage Geospatial Database and related GIS data through an interactive map requiring only an internet connection and browser. This application will include map display, spatial query, pan/zoom, find address, and buffering/proximity tools for the interactive map users.

During this phase of the project, UDWR will be developing the application with support from the Washington Natural Heritage Program in the Washington Department of Natural Resources and the Oregon Natural Heritage Information Center in the Institute for Natural Resources at Oregon State University. These programs will cooperate in the development of the web-interface for biologists and environmental review professionals, as part of an effort to better exchange information with partners.

Goal 7. Publish project report

At the conclusion of the project, the Heritage Program, with aid from AGRC, will prepare a comprehensive report on the activities conducted under the grant. The report will include detail on each task completed and its outcome. We will also make note of lessons learned during the process to help future programs enhance there project efficiency and development.